

Notice of Allowability

Application No.

09/680,131

Examiner

Quoc A. Tran

Applicant(s)

BOEHMER ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Application's Amendment filed 06/07/2004 and Interview 08/28/2006.
2. ☒ The allowed claim(s) is/are 31-45 & 47-55 (renumbering as 1-5, 7-8, 6, 9-20, 22-23, 21, & 24 respectively).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 03/12/2002
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 08/28/2006
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

William L. Bashore
WILLIAM BASHORE
PRIMARY EXAMINER

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Minh N. Nguyen, Reg. No. 53,864 Attorney for Applicant(s) on August 28, 2006.

The application has been amended as follows:

Claims 1-30 (Canceled)

31. (Currently Amended) A computer readable medium having a computer program for optimizing a schedule for scheduling a plurality of agents within a call center, the program for performing the steps of:

generating an initial schedule for the plurality of agents within the call center according to at least one rule, comprising,

displaying a current rule fragment that is a portion of a completed rule used to generate the initial schedule for the plurality of agents within the call center;

accepting user input to create the completed rule from the rule fragment, wherein user input includes a selection from a displayed list, and a value directly entered by the user;

accepting a tolerance input by the user, wherein the tolerance is placed on the completed rule;

applying branching rules to previous user selections, such that future selection lists may be generated based on the previous user selections; and

converting the completed rule into an internal representation suitable for input into a resource scheduling system for generating the initial schedule;

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removing a shift from the initial schedule, thereby creating a shift-reduced schedule, wherein the shift comprises at least one agent, at least one time slot, and at least one break offset value, wherein the initial and shift-reduced schedules comprise a plurality of shifts assigning the plurality of agents to time slots and to break offset values;

creating a plurality of ~~possible~~ first schedules for the plurality of agents within the call center, the plurality of ~~possible~~ first schedules including adding an array of different ~~possible~~ first shifts individually to the shift-reduced schedule, wherein the ~~possible~~ first shifts are break-unspecified shifts and have indeterminate break times;

evaluating a score function for each of the plurality of ~~possible~~ first schedules, wherein the ~~possible~~ first schedules have different ~~possible~~ first shifts added, wherein the different ~~possible~~ first shifts comprise all time slots in the schedule for which the plurality of agents can work;

selecting ~~an-improved-a~~ second schedule from among the plurality of ~~possible~~ first schedules, wherein the ~~improved~~ second schedule is characterized by ~~an-improved-a~~ value of the score function; and

scheduling the plurality of agents within the call center in accordance with the ~~improved~~ second schedule.

32. (Previously Presented) The program of claim 31, wherein generating an initial schedule according to at least one rule further comprises accessing a dynamic database to populate the displayed lists depending on current values in the dynamic database.

33. (Previously Presented) The program of claim 31, wherein generating an initial schedule according to at least one rule further comprises assigning the completed rule to at least one agent of the plurality of agents.

34. (Previously Presented) The program of claim 31 further comprising repeatedly removing, adding, evaluating, and selecting until a locally optimal schedule is obtained.

35. (Currently Amended) The program of claim of claim 31 further comprising:

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generating at least one break-unspecified shift, including unscheduling at least one break to make the breaks indeterminate;

creating a plurality of ~~possible~~ first break times for each break-unspecified shift, including adding an array of different ~~possible~~ first break offset values

for each break-unspecified shift, evaluating a score function for each of the plurality of ~~possible~~ first break times; and

selecting a schedule having ~~improved~~ second break times from the ~~possible~~ first schedules having ~~possible~~ first break times, wherein the ~~improved~~ second break times are characterized by ~~improved~~ second scores.

36. (Currently Amended) The program of claim 31, wherein the evaluation of the score function for ~~a possible~~ the first schedule includes the calculation of a stochastic factor.

37. (Currently Amended) The program of claim 31, wherein the evaluation of the score function for ~~a possible~~ the first schedule includes selecting one of a plurality of predetermined values corresponding to distinct staffing levels for an interval in the ~~possible~~ first schedule.

38. (Currently Amended) The program of claim 35, wherein the plurality of predetermined values comprises four values corresponding to whether the interval in the ~~possible first schedule is very understaffed, slightly understaffed, slightly overstaffed, or very overstaffed~~ corresponds to a first threshold of being understaffed, a second threshold of being understaffed, a first threshold of being overstaffed, or a second threshold of being overstaffed.

39. (Currently Amended) The program of claim 31, wherein the different ~~possible first~~ shifts further comprise a subset of the plurality of agents and all time slots in the schedule for which the subset of the plurality of agents can work.

40. (Currently Amended) A computer readable medium having a computer program for optimizing a schedule for scheduling a set of agents within a call center, the program for performing the steps of:

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generating a preliminary schedule for the set of agents within the call center from an agent list, agent staffing requirements, and at least one rule specified by a user, including,

displaying a current rule fragment that is a portion of a completed rule used to generate the preliminary schedule for the set of agents within the call center;

accepting user input to create the completed rule from the rule fragment, wherein user input includes a selection from a displayed list, and a value directly entered by the user;

accepting a tolerance input by the user, wherein the tolerance is placed on the completed rule;

applying branching rules to previous user selections, such that future selection lists may be generated based on the previous user selections; and

converting the completed rule into an internal representation suitable for input into a resource scheduling system for generating the preliminary schedule, wherein the preliminary schedule comprises a plurality of shifts assigning the set of agents to slots and to break offset values;

removing from the preliminary schedule a first shift comprising a first agent of the set of agents;

responsive to removing the first shift from the preliminary schedule, generating a plurality of ~~possible~~ first schedules having zero or more different ~~possible~~ first shifts added, wherein the different ~~possible~~ first shifts comprise time slots in the plurality of ~~possible~~ first schedules for which the first agent can work, and wherein the different ~~possible~~ first shifts are break-unspecified shifts and have indeterminate break times;

evaluating a score function for each of the plurality of ~~possible~~ first schedules based on the indeterminate break times;

selecting ~~an-improved-a second~~ schedule from among the plurality of ~~possible~~ first schedules, wherein the ~~improved~~ second schedule is characterized by an-improved ~~_____a~~ value of the score function; and

scheduling the set of agents in accordance with the ~~improved~~ second schedule.

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41. (Previously Presented) The program of claim 40, wherein generating an initial schedule according to at least one rule further comprises accessing a dynamic database to populate the displayed lists depending on current values in the dynamic database.

42. (Previously Presented) The program of claim 40, wherein generating an initial schedule according to at least one rule further comprises assigning the completed rule to at least one agent of the set of agents.

43. (Currently Amended) The program of claim 40 further comprising removing from the preliminary schedule a second shift comprising a second agent, wherein the different ~~possible~~ first shifts comprise time slots in the plurality of ~~possible~~ first schedules for which the second agent can work, and scheduling the second agent.

44. (Previously Presented) A system for generating a schedule for a plurality of agents within a call center, comprising:

an interface system configured to generate at least one rule, the interface system comprising,

at least one display device configured to display a current rule fragment that is a portion of a completed used in generating a schedule for the plurality of agents within the call center,

at least one input device configured to receive user input to create the completed rule from the rule fragment, wherein user input includes,

a selection from a displayed list,

a value directly entered by a user,

at least one self-referential constraint imposed on the completed rule, wherein the at least one self-referential constraint is assignable to at least one agent of the plurality of agents to be scheduled within the call center; and

at least one self-referential tolerance imposed on the completed rule;

a processor configured to apply branching rules to previous user selections, such that future selection lists may be generated based on the previous user selections, and

a conversion processing element configured to convert the completed rule into an internal representation suitable for input into a resource scheduling system for generating an initial schedule for the plurality of agents within the call center; and
a resource scheduling system configured to generate an optimized schedule from the initial schedule, including,

removing a shift from the initial schedule, thereby creating a shift-reduced schedule, wherein the shift comprises at least one agent, at least one time slot, and at least one break offset value, wherein the schedule comprises a plurality of shifts assigning the at least one agent of the plurality of agents to time slots and to break offset values;

creating a plurality of possible first schedules for the plurality of agents, the plurality of possible first schedules including adding an array of different possible first shifts individually to the shift-reduced schedule, wherein the possible first shifts are break-unspecified shifts and have indeterminate break times;

evaluating a score function for each of the plurality of possible first schedules, wherein the possible first schedules have different possible first shifts added, wherein the different possible first shifts comprise all time slots in the schedule for which the agent can work;

selecting ~~an improved a second~~ a second schedule from among the plurality of possible first schedules, wherein the ~~improved-second~~ second schedule is characterized by ~~an improved a~~ a value of the score function; and

scheduling the plurality of agents in accordance with the optimized schedule.

45. (Previously Presented) The system of claim 44, wherein interface system further comprises a dynamic database, wherein generating at least one rule further comprises accessing the dynamic database to populate the displayed lists depending on current values in the dynamic database.

46. (Canceled)

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47. (Currently Amended) A computer-readable medium, having instructions stored thereon, which when executed, cause at least one processor to:

generate an initial schedule for agents within a call center according to at least one rule, comprising,

displaying a current rule fragment that is a portion of a completed rule used to generate the initial schedule for the agents within the call center;

accepting user input to create the completed rule from the rule fragment, wherein user input includes a selection from a displayed list, and a value directly entered by a user;

accepting a tolerance input by the user;

applying branching rules to previous user selections, such that future selection lists may be generated based on the previous user selections; and

converting the completed rule into an internal representation suitable for input into a resource scheduling system for generating the initial schedule;

remove a shift from the initial schedule, thereby creating a shift-reduced schedule, wherein the shift comprises at least one agent, at least one time slot, and at least one break offset value, wherein the schedule comprises a plurality of shifts assigning the agents to time slots and to break offset values;

create a plurality of ~~possible~~ first schedules for the agents within the call center, including adding an array of different ~~possible~~ first shifts individually to the shift-reduced schedule, wherein the ~~possible~~ first shifts are break-unspecified shifts and have indeterminate break times;

evaluate a score function for each of the plurality of ~~possible~~ first schedules, wherein the ~~possible~~ first schedules have different ~~possible~~ first shifts added, wherein the different ~~possible~~ first shifts comprise all time slots in the schedule for which the agent can work;

select ~~an improved-a second~~ schedule from among the plurality of ~~possible~~ first schedules, wherein the ~~improved-second~~ schedule is characterized by ~~an improved-a~~ value of the score function; and

schedule the agents in accordance with the ~~improved-second~~ schedule.

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48. (Previously Presented) The computer-readable medium of claim 47, wherein generating an initial schedule according to at least one rule further comprises accessing a dynamic database to populate the displayed lists depending on current values in the dynamic database.

49. (Previously Presented) The computer-readable medium of claim 47, wherein generating an initial schedule according to at least one rule further comprises assigning the completed rule to at least one agent of the plurality of agents.

50. (Previously Presented) The computer-readable medium of claim 47, further comprising repeatedly removing, adding, evaluating, and selecting until a locally optimal schedule is obtained.

51. (Currently Amended) The computer-readable medium of claim 47, wherein the instruction, when executed, further cause the at least one processor to:

generate at least one break-unspecified shift, including unscheduling at least one break to make the breaks indeterminate;

create a plurality of ~~possible~~ first break times for each break-unspecified shift, including adding an array of different ~~possible~~ first break offset values

for each break-unspecified shift, evaluate a score function for each of the plurality of ~~possible~~ first break times; and

select a schedule having ~~possible~~ first break times from the ~~possible~~ first schedules having ~~possible~~ the first break times, wherein the ~~improved-second~~ break times are characterized by ~~improved-second~~ scores.

52. (Currently Amended) The computer-readable medium of claim 47, wherein the evaluation of the score function for a ~~possible~~ the first schedule includes the calculation of a stochastic factor.

53. (Currently Amended) The computer-readable medium of claim 47, wherein the evaluation of the score function for a ~~possible~~ the first schedule includes selecting one of a

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plurality of predetermined values corresponding to distinct staffing levels for an interval in the possible first schedule.

54. (Currently Amended) The computer-readable medium of claim 51 wherein the plurality of predetermined values comprises four values corresponding to whether the interval in the possible first schedule is ~~very understaffed, slightly understaffed, slightly overstaffed, or very overstaffed~~ corresponds to a first threshold of being understaffed, a second threshold of being understaffed, a first threshold of being overstaffed, or a second threshold of being overstaffed.

55. (Currently Amended) The computer-readable medium of claim 47, wherein the different possible first shifts further comprise a subset of the at least one agent and all time slots in the schedule for which the subset of agents can work.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quoc A. Tran whose telephone number is (571) 272-4103. The examiner can normally be reached on Monday through Friday from 8 AM to 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Herndon R. Heather can be reached on (571) -272-4136. The fax phone number for the organization where this application or proceeding is assigned is (571)-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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